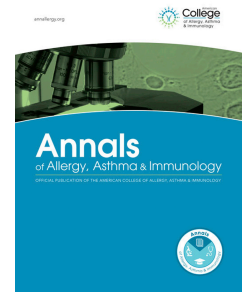


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Asthma Status and Risks among Lesbian, Gay, and Bisexual Adults in the United States:

A Scoping Review

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Asthma is uncontrolled in up to 71% of adolescents and adults,¹ resulting in higher healthcare costs, more school and work absences, and higher mortality.^{1,2} Sexual minority adults (SM; e.g., people who identify as lesbian, gay, or bisexual, or who have same-sex partners) have higher rates of asthma than heterosexual counterparts.^{3,4} However, it is unclear whether rates and risk factors differ by sexual identity. To address this critical knowledge gap, we conducted a scoping review to systematically search relevant literature following current guidelines.⁵ Scoping reviews are ideal for addressing research questions in areas with emerging evidence, such as SM health. English-language original research articles on rates, risks, and outcomes of asthma in the U.S. published between January 1, 2000 and July 31, 2017 were included. We had no age restrictions for the samples but excluded studies focused on HIV/AIDS and on transgender individuals because although they share some risks with SMs, health status and access differ substantially.

We systematically searched the literature in PubMed, PsychInfo, CINAHL, and Web of Science using the term “asthma” and SM-related terms. Broad lung health terms and asthma synonyms/symptoms (e.g., wheezing, dyspnea) were included to broaden the search (see online supplement for full search string). After removing duplicates and applying the inclusion and exclusion criteria delineated above, 34 articles remained. Each author critically reviewed every article’s full text. This process resulted in the 22 studies included in this review (Figure 1).

The majority (82%) of studies used population-based samples; three used convenience samples. Most (82%) studies defined sexual orientation using sexual identity; 28% used behavior (e.g., same-sex partner or same-sex relationships) as an indicator of SM status. Most studies (68%) characterized asthma based on self-report of ever being diagnosed by a clinician; 23% relied on self-report of asthma without specifying if clinician-diagnosed. The majority (82%)

asked whether participants had ever had asthma; 9% asked about current asthma and one study asked about both lifetime and current asthma.

Studies comparing SM women (SMW) and heterosexual women generally showed significantly higher rates of asthma among SMW;^{a-j} only three studies failed to find significant differences.^{k-m} Compared to heterosexual men, asthma rates were significantly higher among bisexual,^{a,d,n} homosexually-experienced,^d and same-sex partnered men.^j However, in contrast to findings among women, more than half (54%) of the studies comparing SM and heterosexual men found no significant differences in asthma rates.^{b,c,e,f,h,l,o} Four studies (18%) aggregated data across SM groups and had conflicting results.^{n,p,q} Three studies (14%) examined racial/ethnic differences; findings were mixed, but suggested higher asthma rates among Latina SMW compared to their heterosexual counterparts.^{j,r}

Most studies (82%) assessed smoking, however, timeframes varied across studies. Although all of these assessed current smoking, only 22% assessed ever smoked. In the few that examined the direct associations between asthma and smoking, SMs generally reported higher rates of both current and lifetime smoking than heterosexuals, but associations with asthma were inconsistent.

Nine studies examined body mass index (BMI) and/or obesity, but few (33%) examined BMI or obesity as a predictor or correlate of asthma. Being overweight or obese was significantly associated with current and lifetime asthma among SMW,^{s,t} but not SMM.^t

Two studies (9%) examined the potential contribution of stressors to asthma. Findings suggest that adverse childhood experiences (ACEs)^q and general stress^j may be associated with asthma among SMs.

In sum, despite higher risks, little research has investigated asthma rates or risk factors among SMs. Complicating conclusions are inconsistencies in asthma measurement, differences in the temporality of asthma and risk factors, and reliance on self-report. No study assessed asthma severity, control, or time since diagnosis. Nevertheless, our findings suggest that asthma risks are higher among SMW than heterosexual women; SMW's higher obesity rates may contribute to this. Limited data suggests that Latina SMW may be at particularly high risk. Most studies found few differences in asthma status among SMM compared to heterosexual men; bisexual men and same-sex partnered men may be at higher risk than heterosexual and gay men.

Although SMs reported higher rates of both current and lifetime smoking than heterosexuals, associations with asthma were inconsistent. Multiple studies assessed cigarette smoking but no studies assessed use of marijuana or alternative tobacco products, such as e-cigarettes. SMs are more likely than heterosexuals to have ever used marijuana and alternative tobacco products,⁶ but asthma-related risk associated with use of these products are poorly understood.

Few studies examined stress as a potential mechanism underlying sexual-orientation-related differences. Although limited findings suggest that ACEs and general stress may increase asthma risk among SMs, no studies examined the role of minority stressors (e.g., discrimination, stigma) or victimization, despite the known effects of minority stress on health. Minority stress may affect physical health via its effects on immune dysregulation, hypothalamic pituitary adrenal function, and autonomic nervous system reactivity.⁷ These processes set the stage for health disparities by worsening symptom severity and increasing risk of both acute and chronic health conditions.⁷ High levels of minority stress and negative affect are associated with negative health behaviors such as unhealthy eating, drinking, and smoking. Indeed, studies show that SMs

69 have multiple risk factors such as high BMI (particularly lesbian women)⁸ and higher rates of
70 unhealthy behaviors, such as smoking⁹ that increase overall health risks, including asthma risk.
71 Complicating this higher risk profile is lower access to healthcare and use of preventive care
72 among SMs.¹⁰

73 Knowledge about risk factors for asthma among SMs is currently limited. However,
74 given findings indicating sexual-orientation-related disparities, researchers should assess sexual
75 identity and include measures that go beyond presence or absence of lifetime asthma to improve
76 understanding of asthma risk, severity, and control and the temporality of asthma and risk
77 factors. Given the sparse literature and inconclusive findings among the studies in our review,
78 more research is needed on the associations between smoking and asthma among SM, including
79 prospective work on mechanisms driving these associations. Greater understanding of asthma
80 risk among SMs is critically important if clinicians are to reduce asthma-related health disparities
81 among their SM patients.

Acknowledgements. This scoping review was funded by an internal grant from the Columbia University School of Nursing (PI: M. George). The authors would like to thank Mr. John Usseglio for his assistance on conducting the systematic search of the literature and Ms. Devondra Pitt for her independent review of the articles.

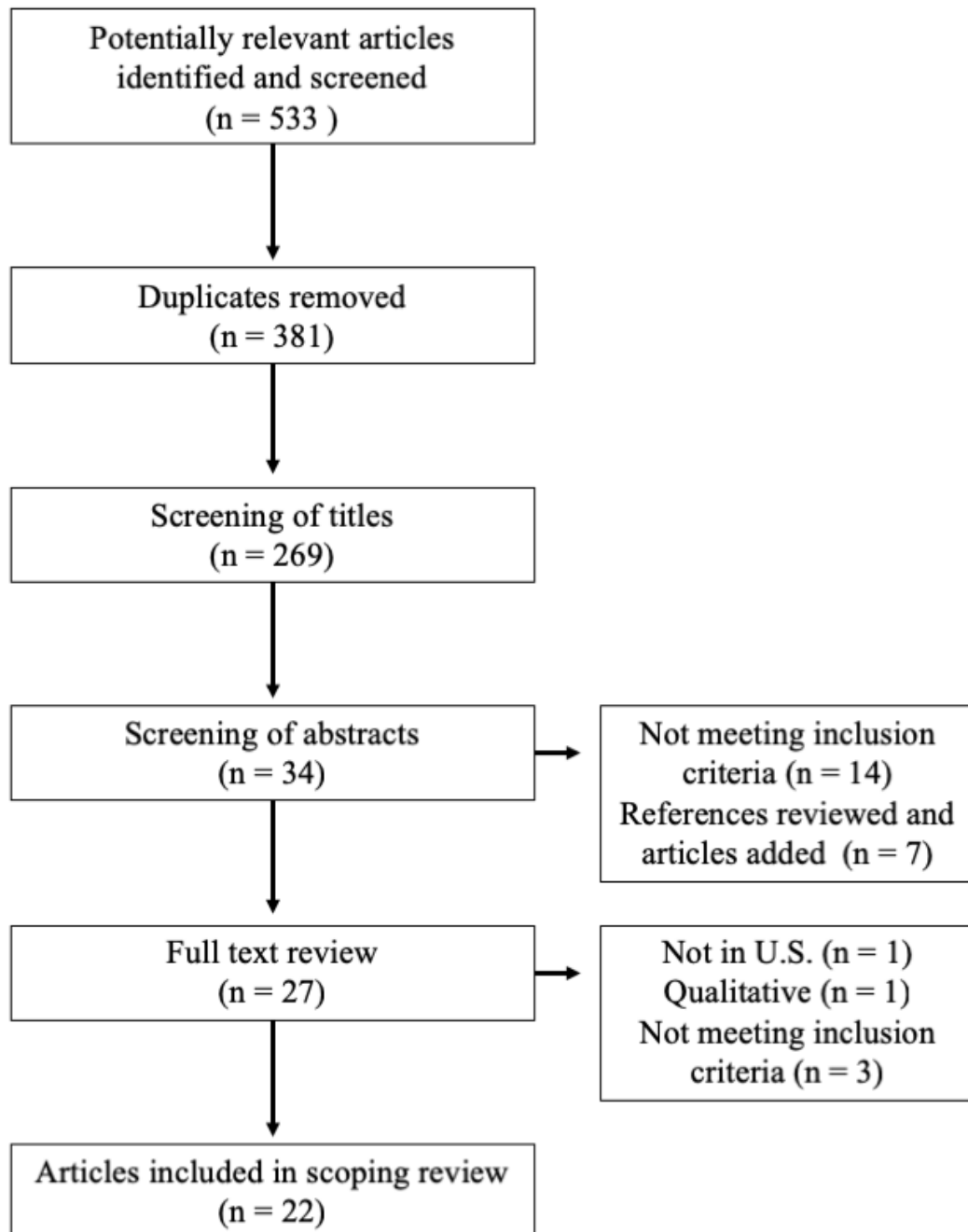
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Table 1. Articles included in the scoping review

#	Reference
[a]	Blosnich JR, Farmer GW, Lee JGL, Silenzio VMB, Bowen DJ. Health inequalities among sexual minority adults. <i>AMEPRE</i> . 2014;46:337-349.
[b]	Blosnich JR, Hanmer J, Yu L, Matthews DD, Kavalieratos D. Health care use, health behaviors, and medical conditions among individuals in same-sex and opposite-sex partnerships. <i>Med Care</i> . 2016;54:547-554.
[c]	Boehmer U, Miao X, Linkletter C, Clark MA. Health conditions in younger, middle, and older ages: Are there differences by sexual orientation? <i>LGBT Health</i> . 2014;1:168-176.
[d]	Cochran SD, Mays VM. Physical health complaints among lesbians, gay men, and bisexual and homosexually experienced heterosexual individuals: results from the California Quality of Life Survey. <i>Am J Public Health</i> . 2007;97:2048-2055.
[e]	Conron KJ, Mimiaga MJ, Landers SJ. A population-based study of sexual orientation identity and gender differences in adult health. <i>Am J Public Health</i> . 2010;100:1953-1960.
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[l]	Matthews DD, Lee JGL. A profile of North Carolina lesbian, gay, and bisexual health disparities, 2011. <i>Am J Public Health</i> . 2014;104:e101-e105.
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[q]	Austin A, Herrick H, Proescholdbell S. Adverse childhood experiences related to poor adult health among lesbian, gay, and bisexual individuals. <i>Am J Public Health</i> . 2016;106:314-320.
[r]	Mays VM, Yancey AK, Cochran SD, Weber M, Fielding JE. Heterogeneity of health disparities among African American, Hispanic, and Asian American women: unrecognized influences of sexual orientation. <i>Am J Public Health</i> . 2002;92:632-639.

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Figure 1. Flow chart of methods

Online supplement. Pubmed search string

("sexual minority" OR "sexual minorities" OR lesbian OR lesbians OR bisexual OR
bisexuals OR bisexuality OR queer OR gay OR LGBT OR LGB OR LGBTQ OR LGBTQIA OR
"homosexual female" OR "homosexual females" OR "homosexual women" OR "homosexual
woman" OR "female homosexuality" OR "homosexual male" OR "homosexual males" OR
"homosexual men" OR "homosexual man" OR "male homosexuality" OR "same sex
relationships" OR "same sex female relationships" OR "same sex male relationships" OR
"mostly heterosexual") AND (asthma OR asthmatic OR "Reactive airway disease" OR
Bronchitis OR "Asthmatic Bronchitis" OR "Wheezy Bronchitis" OR Pneumonia OR "acute
exacerbation" OR "pulmonary disease" OR "respiratory insufficiency" OR "airway obstruction"
OR "obstructive lung disease" OR "airway hyper-responsiveness respiratory hypersensitivity"
OR "airway inflammation" OR "intermittent airway obstruction" OR wheezing OR dyspnea OR
paroxysmal)